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Toward an "Awareness" of the Relationship between Task Performance and Own Verbal Accounts of that Performance

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The existence of learning without awareness has been debated for many years. Learning without awareness is said to occur when an individual's behavior has been affected without that individual being aware of the conditions affecting the behavior, of the relationship between those conditions and the behavior, or of the fact that the behavior has changed. This paper describes a series of experiments investigating this phenomenon. The findings support the existence of "learning without awareness." However, it is argued that the term "awareness" should be discarded as it is misleading. Instead, the results of the experiments are discussed in terms of behavior for which the individual does not provide a complete verbal account.

Key words: learning without awareness, verbal behavior, card sorting, dissociation.

Thorndike and Rock (1934) wrote that ". . . a satisfying after-effect could strengthen the connection which it followed and to which it belonged in cases where the learner did not know what the connection was." (p. 1) This quote describes a phenomenon that has been called "learning without awareness." Many authors have investigated this phenomenon using a variety of techniques and experimental tasks including: reinforcing verbal responses (e.g., Lieberman, Sunnucks, & Kirk, 1998; Philbric & Postman, 1954); reinforcing certain categories of words (e.g., Bizo & Sweeney, 2005; DeNike, 1964; Greenspoon, 1955; Lieberman, Connell, & Moos, 1998; Rosenfeld & Baer, 1970; Wilson & Verplanck, 1956); artificial grammar (e.g., Reber, 1967); target location (e.g., Bullemer, Willingham, & Nissen, 1989; Lewicki, Czyzewska, & Hoffman, 1987; Stadler, 1989); affective judgments (e.g., Kunst-Wilson & Zajonc, 1980; Lewicki, 1986); and serial reaction time tasks (e.g., Hartman, Knopman, & Nissen, 1989; Willingham & Goedert-Eschmann, 1999). While the present paper is concerned with operant behaviors, interested readers should see Lovibond and Shanks (2002) for a review of the literature concerning "awareness" and Pavlovian conditioning.

Taking the literature as a whole, learning without awareness is said to occur when it can be demonstrated that an individual's behavior has been affected without that individual being aware of the conditions affecting the behavior, of the relation between those conditions and his or her behavior, and/or of the fact that the behavior has changed. Some authors, including Verplanck (1992), have recognized the problems inherent in using the term "awareness" in this way. I would like to further the argument that what is being studied is not "awareness" but rather behavior and that "learning without awareness" should be recognized as a dissociation of performance on some task and other, usually verbal, behavior related to that performance. In studies of "learning without awareness," the behavior of which one is said to be "aware" or "unaware" may be verbal or nonverbal, but the behavior assumed to be an indication of awareness is nearly always verbal. Unfortunately, many authors have made the leap from "verbal behavior" to "awareness" with no explanation for why this was done. As Erikson (1960) pointed out, there is nothing special about verbal behavior that should make it indicative of awareness. While the present paper is concerned mainly with verbal behavior, even if nonverbal measures are used we are still observing behavior, not "awareness."

Several experimental questions can be addressed by the types of studies that so far have

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claimed to be measuring awareness. One is whether individuals will learn to do something in the absence of verbal behavior accounting for or describing what they have learned. Another is whether these verbalizations are necessary for improved performance or whether they merely accompany it. If the first question is answered affirmatively, then the answer to the second will obviously be that the statements are not necessary. Third, studies can attempt to determine the conditions that influence the relationship between behaviors and verbal accounts of those behaviors. Of particular interest in this discussion are the conditions that produce changes in either the behaviors or the verbal accounts but not both. For example, there is the possibility that a participant's performance on some experimental task may change with no accompanying change in verbal behavior. This is the case that is often pointed to as evidence of learning without awareness.

This relationship between task performance and verbal behavior is often investigated through a dissociation paradigm as described by Reingold and Merikle (1988). Studies that follow this paradigm make use of two types of measures. One measure indicates whether the participant's behavior was influenced by the experimental conditions and another indicates whether another behavior, supposed to indicate awareness, also changes. Usually, this means determining whether the participant provides a verbal account of the change in behavior or of the contingencies effecting that change. For example, Greenspoon (1955) reinforced participants' saying plural nouns. The number of plural nouns was recorded, as were the participants' answers to questions about what had taken place. The contingent presentation of "mm-hmm" increased the rate of plural nouns in participants who did not report noticing the contingency. In studies such as this, a participant whose performance changes in the absence of verbal behavior accounting for or describing the change is said to have demonstrated learning without awareness.

Verplanck (1992) gave participants 110 cards, one at a time. The participants were instructed to place each card to the right or left and to state why they had selected a particular side. Following each placement, the experimenter said "right" or "wrong" and then presented the next card. "Right" and "wrong" were contingent on either correct placement or on statement of a predetermined rule. This rule was that cards depicting one principle object belonged on one side and cards depicting more than one principle object belonged on the other side. Verplanck found that this procedure was successful in dissociating participants' placements and stated hypotheses. This was a particularly impressive demonstration of the dissociation of behavior and verbal accounts of that behavior because the task and the rule were quite simple. Some other studies of "learning without awareness," such as the artificial grammar studies, employed relatively complex rules that may be more difficulate to articulate. Using such a simple rule is one of the ways that this study avoided the problem with the sensitivity criterion faced by some other studies. The sensitivity criterion as presented by Shanks and St. John (1994) is as follows.

Sensitivity Criterion: To show that two dependent variables (in this case, tests of conscious knowledge and task performance) relate to dissociable underlying systems, we must be able to show that our test of awareness is sensitive to all of the relevant conscious knowledge (Shanks and St. John, 1994, p. 373).

Put another way, in studies of learning without awareness, measures of awareness must be sensitive enough to detect "awareness." Shanks and St. John go on to say that the measures of awareness must at least be as sensitive as the performance measures.

In Verplanck's study, verbal responses were recorded following each placement. This reduced the possibility of participants forgetting important information concerning how they sorted the cards. It probably also reduced the likelihood of participants failing to report parital rules. In some other studies of learning without awareness, verbal responses concerning the contingencies and/or performance were recorded only after certain trials (e.g., De Nike 1964) or at the end of the session (e.g., Bullemer et al. 1989, Greenspoon 1955, Hartman et al. 1989). Such procedures almost certainly reduce the chances of detecting relevant verbal behavior. Another concern is the following information criterion.

Information Criterion: Before concluding that subjects are unaware of the information that they have learned and that is influencing their behavior, it must be possible to establish that the information the experimenter is look-

ing for in the awareness test is indeed the information responsible for performance changes (Shanks and St. John, 1994, p. 373).

The present studies sought to satisfy this criterion by determining whether rules reported by participants would be consistent with correct card placement. Such rules would have to be considered correct even if they were different from the predetermined "correct" rule.

The present studies are comprised of a replication and extension of Verplanck's (1992) study. These studies further investigated the relationship between task performance and verbal behavior related to that performance and helped to clarify the point that what some authors have termed "learning without awareness" is, in fact, a dissociation of task performance and verbal behavior.

EXPERIMENT 1

Experiment 1 was a direct replication of Verplanck's (1992) experiment. Except where noted, all experiments reported here followed the same procedure as Experiment 1.

Method

Participants

Five male and 12 female undergraduate students served as participants in Experiment 1.

Materials and Setting

The stimulus materials consisted of 110 cards like those used by Verplanck (1992). Two small cardboard boxes were fixed to a table. The box on the participants' left was labeled "L" and the box on the participants' right was labeled "R." A cassette recorder was used to record verbal data.

Procedure

Each participant was tested individually. The participant sat at a table facing the experimenter. An assistant sat behind the participant to record responses. At the start of the session, the following instructions were read:

> In this experiment I will place 110 cards in front of you, one card at a time. Some cards belong in the box on the right and some belong in the box on the left. Your task is to place each card on the side to which it belongs. (Each time you place a card, I would like you to tell me at the same time why you selected that side. Please try to speak clearly and loudly enough so that we can record your responses.) I will then say "right" or "wrong" and then present the next card. It is possible to place all of the cards correctly.

The session then proceeded as indicated in the instructions.

Participants were placed into three groups, labeled P, PH, and PH.[1] In each case, P refers to "placement" (of the cards) and H refers to "hypothesis," that is, participant statements. The underlined letter in each case indicates which response was reinforced. Participants in group P placed the cards but were not required to say anything. Participants in groups PH and PH were required to make verbal responses and so received the instructions to say why they selected a particular side on each placement. That is, they received the instructions in the parentheses, group P did not. Participants in groups P and PH were told "right" or "wrong" following each placement based on whether that placement was correct according to a predetermined rule. Participants in group PH were told "right" or "wrong" following each placement based on whether the participants' statements were correct according to the predetermined rule.

In all cases, the rule was that cards depicting one principle object belonged on one side and cards depicting two or more principle objects belonged on the other side. In all experiments reported here, cards depicting one principle object belonged on the left for approximately half the participants and on the right for the remaining participants. Participants in experiment 1 were told "right" following each correct response and "wrong" following each incorrect response until they achieved 10 consecutive correct. For the remainder of the session, responding was placed on a partial reinforcement schedule. Participants were told "wrong" following each incorrect response and following 4 out of every 10 correct responses. Participants were told "right" following the remaining 6 out of 10 correct responses. The trials on which the participants were told "wrong" following correct responses were predetermined randomly. This was the procedure

[1] This is the notation used by Verplanck (1992).

Table 1
Proportion of correct responses before and after criterion for participants in experiment 1.

	Precriterion placements statements		Postcriterion placements statements		Probability of meeting criterion in observed number of trials
Group P					
218f	17/29	n/a	64/71	n/a	.0293
261f	13/24	n/a	59/76	n/a	.0244
673m	28/66	n/a	31/34	n/a	.0654
*794f	0/1	n/a	68/99	n/a	.0020
937f	2/3	n/a	53/97	n/a	.0039
967f	54/110	n/a	n/a	n/a	
Group PH					
*102m	24/50	0/50	36/50	0/50	.0498
*239m	25/39	1/39	55/61	16/61	.0391
302f	60/110	0/110	n/a	n/a	
*318f	40/62	4/62	30/38	0/38	.0615
642f	53/110	0/110	n/a	n/a	
Group PH					
214f	5/10	0/10	61/90	55/90	.0107
222f	64/110	0/110	n/a	n/a	
334f	9/13	0/13	81/87	81/87	.0137
546f	52/110	0/110	n/a	n/a	
555m	56/110	0/110	n/a	n/a	
663m	51/110	0/110	n/a	n/a	

Note: Participants marked with an * were determined to have demonstrated a dissociation of verbal and nonverbal behaviors.

used by Verplanck (1992). This partial reinforcement schedule was used because it increased the likelihood of a dissociation between verbal behavior and card sorting following the meeting of the criterion. If participants were told "right" after every correct response, they would most likely continue the pattern of responding that led to meeting the criterion. For some participants, verbal behavior and card sorting were affected differently by this reinforcement schedule. The session ended when all 110 cards had been presented. Following this, each participant was asked, "What was the rule for successfully sorting the cards?" Each participant was assigned an arbitrary number followed by an "f" for female or "m" for male.

Results

The data from experiment 1 are summarized in Table 1. The table shows the number of correct placements and statements before and after the criterion of 10 consecutive correct responses was met. For participants who met the criterion, Table 1 also lists the probability of correctly placing 10 cards consecutively within the number of trials taken by each participant to reach the criterion. For any given number of trials X, there are 2^X possible right/left combinations. There are X-9 trials on which a run of 10 consecutive corrective responses could start. For each of these, the trials other than those 10 result in 2^{X-10} possible combinations. So, the probabilities were calculated using the following formula: $(X-9) \times 2^{X-10}/2^X$, where X is the number of trials taken by each participant. Both in the table and in the following text, the ten responses that constituted meeting the criterion are omitted. This was done to clearly distinguish between precriterion and postcriterion responding. For example, P218f placed 17 of the first 29 cards correctly. The next 10 placements, numbers 30-39, were correct. Then she

Table 2
Proportion of correct placements before criterion for participants in experiment 2.

	placements	stated rule
Experiment 2A		
012f	59/110	no
208m	27/59	yes
271f	63/110	no
444f	47/110	yes
483m	9/13	yes
998f	10/10	yes
Experiment 2B		
102f	67/110	no
128f	3/5	yes
131f	28/42	yes
374f	2/5	yes
410f	32/60	yes
738f	7/11	yes
752f	16/22	yes
987f	72/110	no

placed 64 of the remaining 71 cards correctly. P794f placed the first card incorrectly then correctly placed the next 10 cards. Following those 10 correct placements, she placed 68 of the remaining 99 cards correctly. P967f did not meet the criterion and placed 54 of the 110 cards correctly.

In group P, 5 out of 6 participants reached the criterion of ten consecutive correct placements. Of these participants, only P794f did not correctly identify the rule when asked immediately after the session.

Of the 5 participants in group PH, 3 reached the criterion of ten consecutive correct placements. All three showed increases in the percentage of correctly placed cards following the meeting of the criterion. However, two of the three showed either no increase or a decrease in the number of correct statements after meeting the criterion. P102m placed 24 of 50 cards correctly prior to correctly placing 10 cards consecutively and 36 of 50 cards correctly afterwards, but never stated the correct rule. Thus, after meeting the criterion, P102m placed a card correctly on 36 trials on which he did not state the correct rule. P318f placed 40 of 62 cards correctly prior to meeting the criterion and 30 of 38 afterwards. She stated the correct rule on 4 of the 62 trials prior to meeting the criterion and on 0 of the 38 subsequently. So, following meeting the criterion, P318f placed a card correctly on 30 trials on which she did not state the correct rule. P239m placed 25 of 39 cards correctly prior to meeting the criterion and 55 of 61 correctly afterwards. P239m's correct statements rose from 1 out of 39 prior to meeting the criterion to 16 of 61 afterward. However, this still results in 39 trials following criterion where P239m placed the cards correctly but did not state the correct rule. The two remaining participants, P302f and P642f did not meet the criterion and did not state the correct rule.

Of the 6 participants in group PH, P334f and P214f met the criterion of ten consecutive correct statements. P334f placed 9 of 13 cards correctly prior to meeting the criterion and thereafter both placed the cards correctly and stated the correct rule on 81 trials. P214f placed 5 of 10 cards correctly prior to meeting the criterion and then placed the cards correctly on 61 trials and stated the correct rule on 55 trials. The four participants who did not meet the criterion never stated the correct rule.

Incorrect statements in this and the following experiments varied greatly both within and between participants and included such responses as naming the color of the card, describing the card in a more general way such as "This card belongs on the right because it looks serious," and simply saying, "I don't know."

Discussion

In these experiments, a dissociation between verbal behavior and task performance may be demonstrated by meeting the criterion for con-

secutive correct placements without stating the rule or by discrepancies between rule statements and card placements following the criterion given that the responses leading to meeting the criterion were statistically unlikely. Before the criterion was met, differences in the participants' verbal and nonverbal behaviors were not surprising since there was a greater chance of placing a card correctly than there was of stating the correct rule. Following the criterion, greater correspondence might be expected between verbal and nonverbal behaviors. Given the number of trials that some of the participants took to meet the criterion and the probalilities of doing so, it seems reasonable to think that they would know how this was accomplished. In group P, 4 of the 6 participants met the criterion of 10 consecutive correct placements and correctly identified the rule when asked following the session. This was the only measure of verbal behavior in group P, so these participants did not demonstrate a dissociation between verbal and nonverbal behavior. Of the remaining 2 participants, 1 was determined to have demonstrated the dissociation. P794f met the criterion and placed a total of 78 cards correctly without identifying the rule. The remaining participant, P967f, did not meet the criterion and placed only 54 cards correctly.

In group PH, participants P102m, P318f, and P239m produced demonstrations of the dissociation of verbal and nonverbal behavior. Their verbalizations do not account for their performances.

No dissociation was apparent in the responses of participants in group PH. Participants either placed approximately 50% of the cards correctly without stating the rule or made approximately the same number of correct placements and statements. P334f made exactly the same number of correct statements and correct placements following criterion. P214f made 6 fewer correct statements than placements following criterion. No participant in group PH who did not state the rule made 10 consecutive correct placements.

No participant in any group in Experiment 1 stated the correct rule during a trial in which the card was placed incorrectly. Since the rule had to include the criterion for sorting the cards as well as a statement of the correct side on which the card should be placed, this is not surprising. This fact is mentioned here to clarify that pariticpants in group PH who met the criterion for 10 consecutive correct statements also placed those 10 cards correctly.

Experiments 2 and 3 were designed as extensions of Verplanck's (1992) work. Specifically, these experiments investigated the effects of varying the conditions presented to group P in experiment 1. "Wrong" was likely a well established punisher for all participants. This may have been a key factor in the dissociation of verbal behavior and task performance. Experiment 2 investigated whether a procedure that lacked this punishing contingency would result in the dissociation. Experiment 2 consists of two parts, 2A and 2B.

EXPERIMENT 2A

Method

Participants

Two male and 4 female undergraduate students served as participants in Experiment 2A.

Procedure

Experiment 2A differed from the procedure used with group P in Experiment 1 in that the experimenter said "right" following correct placements, but said nothing following incorrect placements. That is, correct responses still resulted in reinforcement, but incorrect responses were placed on extinction rather than being punished. The instructions were changed accordingly. The session was terminated when the participant reached the criterion of ten consecutive correct placements or after 110 trials.

Results

The results for Experiment 2A can be found in Table 2. Three out of the 6 participants in experiment 2A reached the criterion of 10 consecutive correct placements. P208m met the criterion after 69 trials, and P483m met the criterion after 23 trials. Both stated the correct rule when asked following the session. P998f placed the first 10 cards correctly and stated a correlated rule that was consistent with this. The three remaining participants did not meet the criterion and did not state the rule.

EXPERIMENT 2B

Method

Participants

Eight female undergraduate students served as participants in Experiment 2B.

Procedure

Experiment 2B differed from Experiment 2A in that rather than saying "right" following correct placements, the experimenter said nothing following correct placements and instead moved incorrectly placed cards to the correct side. It was thought that moving having the experimenter move the cards to the correct side might be less punishing than "wrong" and that the likelihood of a dissociation between verbal behavior and task performance might be affected. As in Experiment 2A, participants were not required to say anything during the session and there were no programmed contingencies for anything they did say. The session was terminated when the participant reached the criterion of 10 consecutive correct placements or after 110 trials.

Participants in experiment 2B received the following instructions:

> In this experiment, I will place 110 cards in front of you one at a time. Some cards belong in the box on the right and some belong in the box on the left. Your task is to place each card on the side to which it belongs. I may occasionally move a card to the other side. See if you can figure out why I am doing that.

Results

Six out of the 8 participants in Experiment 2B reached the criterion of 10 consecutive correct placements. P374f and P128f each met the criterion after 15 trials, P738f after 21 trials, P752f after 32 trials, P131f after 52 trials, and P410f met the criterion after 70 trials. All six of these participants stated the correct rule when asked following the session. The two remaining participants did not meet the criterion and did not state the rule.

Discussion

Experiments 2A and 2B investigated the effects on performance of variations in Verplanck's (1992) procedure. Neither demonstrated a dissociation between verbal and nonverbal behavior. All participants who met the criterion for correct card placements stated the correct rule at the end of the session. Further, no participants who did not identify the rule placed the cards correctly on more than 66% of the trials.

EXPERIMENT 3

In the previous experiments, participants were required to place cards into piles or were required to place cards and to say why they were sorting them in a particular way. Experiment 3 was designed to add to these studies by investigating the previously neglected option of having participants engage in verbal behavior alone without having to sort cards. This allowed for examination of whether verbal behavior was being affected by concurrent task performance. In other words, Experiment 3 investigated whether participants would be more or less likely to state the correct rule when they did not actually place the cards themselves. Not having to place the cards means that less is required of the individual, suggesting that performance might be improved. On the other hand, participants who do not place the cards are missing a potentially important learning opportunity. It is possible that this could result in a decreased likelihood of successful card sorting. Like Experiment 1, Experiment 3 continued until 110 trials had been completed.

Method

Participants

Three male undergraduate students served as participants in Experiment 3.

Procedure

Participants were given the following instructions:

> In this experiment I will place 110 cards in front of you, one card at a time. Some cards belong in the box on the right and some belong in the box on the left. I will show you each card and then place it in the box in which it belongs. Following each card I would like you to tell me why you think I selected that side.

All cards were placed correctly by the experimenter according to the predetermined rule. After each placement, the experimenter waited for a verbal response from the participant and then said "right" or "wrong," depending on whether the participant had stated the correct rule. If the participant met the criterion of 10 consecutive correct statements, the partial reinforcement schedule from Experiment 1 was employed.

Results

Two of 3 participants in experiment 3 reached the criterion of 10 consecutive correct statements. P887m reached the criterion after 45 trials. He made 0 correct and 35 incorrect statements prior to the ten consecutive correct. Following the 45th trial he made 65 correct and 0 incorrect statements. P002m reached the criterion after 17 trials. Prior to meeting the 10 consecutive correct trials he made 0 correct and 7 incorrect statements. Following the 17th trial he made 83 correct and 10 incorrect statements. The third participant, P494m, never stated the correct rule.

Discussion

Experiment 3, unlike Experiments 1 and 2, did not investigate the dissociation of verbal and nonverbal behavior. Since the participants had only one task to perform, namely stating the correct rule, there was no behavior to be related to rule statements. This experiment was designed to determine how the behavior of stating rules was affected by the contingencies when the participants did not sort the cards. P887m and P002m never stated the correct rule prior to the 10 consecutive correct statements. Once they first stated the correct rule, they continued to do so with no exceptions by P887m and only 10 by P002m.

GENERAL DISCUSSION

The preceeding experiments have investigated an important aspect of the relationship between task performance and verbal behavior concerning that performance. Some of the participants did not provide verbal behavior that would account for their performances on the card sorting task. That is, they met the criterion of 10 consecutive correct placements without ever identifying the correct rule or met the criterion but afterward placed cards correctly on trials during which they did not state the correct rule.

The results from group PH in Experiment 1 were similar to those obtained by Verplanck (1992). When reinforcement was contingent on correct placement, placement improved without a corresponding improvement in verbal behavior in some cases. The results of the present study differed from Verplanck's in that the reverse relation was not demonstrated. Some participants in group PH in Verplanck's study met the criterion for correct hypotheses without placing the cards as well as would be expected. No participant in the present studies stated the correct rule on a trial where the card was not placed correctly. This difference may have been due to the acceptance of different rules. As stated earlier, in the present studies statements had to include the correct side on which the card was to be placed for the statement to be reinforced. Further, Verplanck only reinforced statements that did not name the object(s) on the cards. For example, "one object belongs on the right" would be reinforced but "one dog belongs on the right" would not. This was presumably done to ensure that the participants' statements were based on the number of objects on the cards rather than the type of objects. In the present studies, both statements that did and did not name the objects were reinforced. This was due to the fact that during a pilot study, participants produced very few statements early in the sessions that did not name the objects. However, following the reinforcement of a variety of statements (e.g., one dog . . . , two guys . . . , one house . . . , etc.) many participants did begin to say "object" or "thing" instead of naming the objects on the cards. Further, it was typical for statements like "one girl belongs on the left" to be followed by "two girls belong on the right," suggesting that the number, and not the girls, was the discriminative stimulus. In the present studies, statements did have to include a number. For example, "a horse" or "some bears" would not be reinforced.

Verplanck did not report any verbal measure for group P. In the present study, one participant in group P met the criterion without stating the correct rule following the session.

No participant in Experiment 2A or Experiment 2B met the criterion without stating the correct rule. Participants in Experiment 2A were the least likely to meet the criterion, only 3 of 6 participants did so. This is compared to 6 of 8 in Experiment 2B and 5 of 6 in group P in Experiment 1.

The results of Experiment 3 may be compared with those of group PH in Experiment 1 since in both cases correct rule statement was the behavior upon which reinforcement was contingent. In Experiment 3, 2 of 3 participants met the criterion for rule statements. In group PH, 2 of 6 participants met the criterion for rule statements. So, reinforcement of verbal responses resulted in some participants meeting the criterion whether the participant or the experimenter placed the cards.

There are some important potential criticisms of these studies that should be addressed. First, there is the problem of correlated rules. It is always possible in studies such as these that the participants could perform successfully on the task while being guided by a rule other than the one the experimenter considers correct. Special care was taken in the present studies to ensure that this was not the case. Participants' verbal responses were examined to see whether they would be consistent with successful card sorting. In only one case was a correlated rule used by a participant discovered. Second, it could be argued that a participant might know the rule for successful card sorting but be unable or unwilling to state it. Additionally, it could be argued that a participant might be purposely placing cards incorrectly. These points are well taken and can be addressed in two ways. First, we should employ the sensitivity and information criteria discussed by Shanks and St. John (1994). Second, we should remember that we never know what an individual is capable of doing; we only know what he or she does. This fact is not problematic if we limit our discussion accordingly. That is, we should speak in terms of behavior rather than "awareness." I propose that the term "learning without awareness" be discarded as it is misleading. "Awareness" is a label that has been given to particular patterns of verbal behavior. Consequently, what may be demonstrated in experiments such as those presented here is not "learning without awareness" but rather behavior of which the individual does not provide a complete verbal account.

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